

Multiple Choice

1. Which of the following is an example of heat conduction?
 - A. An air vent from a furnace sending hot air into the house.
 - B. A metal cup heating up when hot water is poured into it.
 - C. The sun melting the ice formed on a frosty lawn.
 - D. Cool air sinking to the ground on a cold night.

2. Which is the best activity to help keep a home cool in the summer?
 - A. Open the refrigerator often.
 - B. Turn off the television, radios and computers.
 - C. Open the windows during the day.
 - D. Close the shades where the sun is shining.

3. In a room in the wintertime, where would you find the warmest air?
 - A. near the ceiling
 - B. near the floor
 - C. in the corners
 - D. by a window

4. What happens to the light particles when light hits an uneven surface.
 - A. They are reflected off in a straight line.
 - B. They are scattered in many directions.
 - C. They are absorbed by the surface.
 - D. They pass through the surface.

5. Why do you see your image in a mirror?
 - A. Light is reflected.
 - B. Light is refracted.
 - C. Light is absorbed.
 - D. Light is diffused.

6. Which of the following is an example of a light reflector?
- A. the planet Mars
 - B. lightning
 - C. exploding fireworks
 - D. stars
7. Why is the moon classified as a light reflector instead of a light producer?
- A. The moon makes its own light from energy within it.
 - B. The moon is visible because light from the sun bounces off of it.
 - C. The moon is not visible from earth during the new moon phase.
 - D. The moon glows from radiant energy below its surface.
8. What happens to a sound as the vibrations of an object increase in strength?
- A. The sound becomes louder.
 - B. The sound becomes softer.
 - C. The sound waves get further apart.
 - D. The pitch of the sound is higher.

Use the table to answer the next two questions.

Sound	Decibel Level	Effect
Jet airplane taking off	160	Damage to hearing
Chain saw	110	
Hair dryer	90	Annoying
Ringling telephone	80	
Normal conversation	60	Acceptable

9. Which of the following might damage hearing?
- A. hair dryer
 - B. conversation
 - C. ringing telephone
 - D. chain saw
10. Which of the following would be annoying but not damaging to hearing?
- A. whisper at 30 decibels
 - B. vacuum cleaner at 75 decibels
 - C. power lawn mower at 90 decibels
 - D. personal cassette player on high at 112 decibels

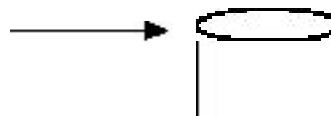
11. What would you do to lower the pitch of a string on a violin?

- A. Pluck the string very lightly.
- B. Shorten the string.
- C. Loosen the string.
- D. Use a thinner string.

12. What would you do to increase the intensity of the sound that a drum makes?

- A. Tap the drum harder.
- B. Loosen the drum head.
- C. Tighten the drum head.
- D. Make the drum head out of a thicker material.

drumhead



Constructed Response

1. Nate was stirring hot soup on the stove. Why should he use a wooden spoon instead of a metal spoon?
2. Heather put a straw in a glass of water. When she looked at the side of the glass she observed that the straw appeared larger and also appeared to be broken. Why did it appear this way?
3. Explain the difference between a light producer and a light reflector.
4. How could a guitar be made to make a louder sound?

Answers for Standard 6 Unit test A

Multiple Choice

1. B
2. C
3. A
4. B
5. A
6. A
7. B
8. A
9. D
10. C
11. C
12. A

Constructed Response

1. *Metal conducts heat very well and wood does not. The heat in the soup will be conducted to the metal spoon and make it too hot to touch, but would not make a wooden spoon too hot.*
2. *When the light entered the glass and the water it was bent or refracted and caused the straw to appear broken. The curved glass caused the light rays to bend or refract and acted as a magnifying glass and made the straw appear larger.*
3. *Students should explain that a light producer makes its own light from energy sources within it such as nuclear reactions, chemical reactions, electrical energy, fire, etc. They should explain that a light reflector does not produce its own light, but reflects light from light sources.*
4. *Pluck the strings harder, with more energy, to increase the loudness of the sound.*

1. By what process does heat energy travel from the sun to Earth?
 - A. Heat is radiated through space.
 - B. Heat is conducted through air molecules.
 - C. Convection of heat through air currents.
 - D. Heat travels through the wind.

2. What makes a hot air balloon rise? The particles of air in the balloon
 - A. decrease in size and make the balloon lighter than air.
 - B. increase in size and make the balloon lighter than air.
 - C. are farther apart and make the balloon lighter than air.
 - D. are closer together and make the balloon lighter than air.

3. What happens to light when it passes through a translucent material such as waxed paper? Most of the light
 - A. passes through.
 - B. is reflected in a straight line.
 - C. is absorbed and very little is reflected.
 - D. is not allowed to pass through.

4. Why are curved mirrors used in car headlights?
 - A. They make things look smaller.
 - B. They make things look bigger.
 - C. They focus light straight ahead.
 - D. They spread light in many directions.

5. Which of the following is an example of a light reflector?
- A. fluorescent light
 - B. fireflies
 - C. concave mirror
 - D. campfire
6. Which of the following would be most likely to cause hearing loss?
- A. burglar alarm
 - B. a dog whistle
 - C. a jet plane taking off
 - D. a symphony concert
7. What causes an echo?
- A. Sound waves are absorbed by an object.
 - B. Sound waves are transmitted through an object.
 - C. Sound waves are reflected off an object.
 - D. Sound waves completely disappear.
8. What would happen if you increased the frequency of a sound?
- A. The sound would get louder.
 - B. The sound would get softer.
 - C. The sound would be higher in pitch.
 - D. The sound would be lower in pitch.
9. What would happen if you increased the intensity of a sound?
- A. The sound would get louder.
 - B. The sound would get softer.
 - C. The sound would be higher.
 - D. The sound would be lower.

10. If you were arranging the aluminum tubes shown below to play a tune, which tube would make the lowest pitch?



A



B



C



D

- A. Tube a
- B. Tube b
- C. Tube c
- D. Tube d

Constructed Response

1. Explain why you are able to see the colors of the rainbow when you look at sunlight shining through the spray from a sprinkler.
2. Describe three different ways light can be produced.
3. Why can a person see his or her reflection in a mirror?
4. What could Whitney do to her drum if she wanted to raise the pitch of the sound her drum makes?
5. Explain how the size and shape of a sound source affect the pitch of a sound. Give two examples to support your idea.

Answers Standard 6-unit test B:

Multiple Choice

1. A
2. C
3. A
4. C
5. C
6. C
7. C
8. C
9. A
10. A

Constructed Response

1. *The water droplets separate white light into the spectrum of colors. White light is made up of the seven colors of the rainbow.*
2. *Students should describe three different ways to produce light such as lightbulbs, candles, matches, flint and steel, chemical processes.*
3. *A mirror has a smooth shiny surface so the light reflecting off a person hits the mirror and bounces off at the same, but opposite angle that it hits the mirror.*
4. *She could tighten the drumhead so that it would be smaller and make more vibrations per second which would raise the pitch.*
5. *Objects that are smaller, shorter, or stretched more tightly produce a higher pitch than do those of objects that are larger or longer because they vibrate at a faster rate. Examples may be such things as a piccolo versus a flute, or a violin versus a bass fiddle.*

Title: Keeping Cool

Activity Description: Students will compare the temperatures of soda pop cans filled with water when they are placed in various insulation materials

Materials:

Per group of four students:

- 4 empty soda pop cans
- 4 32 oz. "Big Gulp" paper cups
- assorted insulation materials: shredded newspaper, quilt batting, styrofoam packing "peanuts," home insulation, etc.
- 4 thermometers (calibrated identically)

For class:

- ice water to fill cans for entire class
- pitchers
- funnels
- worksheets (see "keeping cool" worksheet)

Prior to assessment: Students need to know how to conduct a controlled experiment. They should be able to read thermometers and organize data in a table.

Time needed: 1or 2 class 45-minute classes

Procedure:

1. Students are directed to conduct a controlled experiment to investigate which kind of insulation keeps the ice water coolest.
2. In the experiment students place empty soda pop cans in the large paper cups. They put three different kinds of insulation around three of the soda pop cans.
3. They should use one soda pop can as a control for the experiment, and no insulation should be placed around it. Students pour cold ice water into each can.
4. Thermometers are placed in the cans, and students measure and record the temperature of the ice water every minute for ten minutes. Students should create a method for recording their temperatures. The teacher may choose to give students guidance in some areas of the assessment. For example, the data table below could be given to the students.

Teachers may want to use a worksheet for students to complete their work.

Scoring Rubric:

1 point: Attempt to conduct a controlled experiment

2 points: Completes some aspects of the controlled experiment

3 points: Completes most aspects of the controlled experiment

4 points: Successfully completes most aspects of the controlled experiment

Name

Date

Title: Keeping Cool

Introduction: In this activity you will see how different insulation materials help keep a can of water cold. After your teacher has explained what materials you will use, make a prediction about which materials will work best to insulate the can.

Prediction:

Procedure:

1. Place the insulating materials in the paper cup and then place the aluminum can inside them.
2. Carefully pour cold water into the can and then place a thermometer in the can.
3. Record the temperatures every other minute for 20 minutes. Write the temperatures in the data table.
4. Clean up as directed.

Data:		Insulating Material	
Minute			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Questions:

1. What is the experimental variable in the experiment?
2. What are some of the controlled variables in the experiment?
3. What materials insulated the best?

Worst?

Title: Mirror, Mirror

Activity Description: Students will compare the angle of a light beam coming into a mirror with the angle of the light beam going out from the mirror.

Materials:(Per group of 4 students)

Flash light

Mirror

Slit card (a 3" x 5" card with a narrow 2 1/2" vertical slit cut in it to allow a single beam of light to pass through)

Degrees Reflection Sheet

Prior to assessment: Students need to know how to organize data in a table.

Time needed: a 45-minute class period

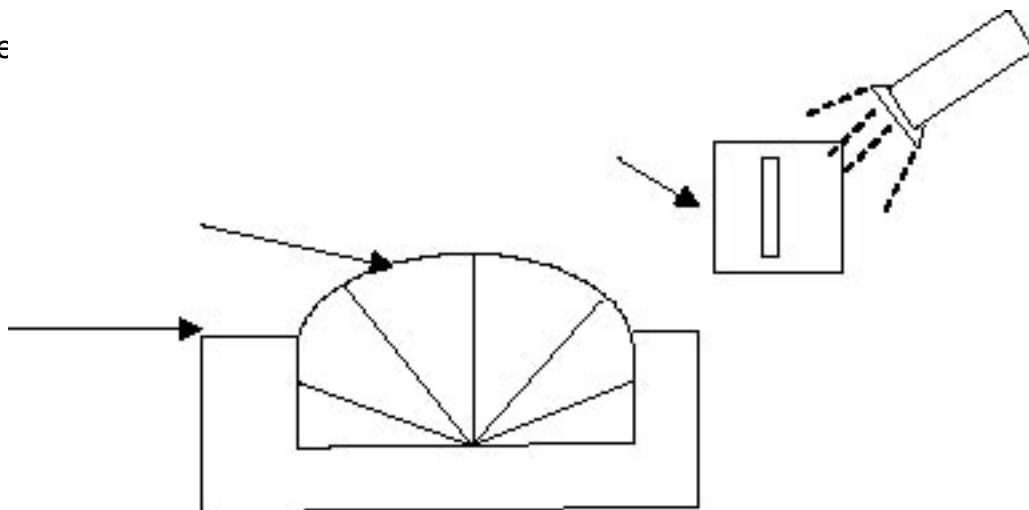
Procedure:

1. Working in partners, one student holds the mirror perpendicular to the back of the protractor.
2. The other student shines the flashlight through the slit card so that a light beam follows one of the degree lines to the center of the protractor. The lights in the room may need to be dimmed
3. Students observe where the reflected light beam bounces, and record the angle of the reflected beam in the chart.
4. Students write a conclusion about the angle of light reflection.

Angle of Light Reflection:

Angle of incoming light rays:

Angle of re



Scoring Rubric:

- 1 point: Student attempts to complete experiment but does not show angle of incidence equaling angle of reflection.*
- 2 points: Student successfully completes some aspects of experiment but does not show equal angles*
- 3 points: Student successfully completes most aspects of experiment and shows equal angles.*
- 4 points: Student successfully completes most aspects of experiment successfully and shows equal angles.*

Title: Musical Pop Bottles

Activity Description: Students will formulate and test a hypothesis about how the pitch changes in sounds made when glass bottles with varying amounts of water in them are tapped with a mallet.

Materials:

For each group of four students or at an individual work station
four empty soda pop bottles or glasses
mallet
graduated cylinders or other ways to measure water
water

Prior to assessment: Students should have had experience with conducting experiments using the scientific method.

Time needed: 1 45-minute class periods

Procedure:

Students are given the materials and asked to formulate a hypothesis about how the sound produced when glass bottles filled with varying amounts of water are tapped with a mallet. Students are instructed to write their hypothesis and then devise an experiment to test the hypothesis. Students should be instructed to use measurements where applicable (water amounts should be measured, for example).

Students should record their findings from the experiment in an organized way such as a data table. Finally students should write a conclusion about their findings.

Scoring Rubric:

1 point: attempts to formulate a hypothesis and conduct an experiment

2 points: formulates a hypothesis and conducts an experiment in which there are some elements of measurement, organization of data and conclusion

3 points: formulates a hypothesis and conducts an experiment in which there are most elements of measurement, organization of data, and conclusion

4 points: formulates a hypothesis, conducts an experiment in which there are all elements of measurement, organization of data, and conclusion

Title: Hello?

Activity Description: Students will make three different string telephones to test sound absorption.

Materials needed:(Per group of four students)

3 2-meter pieces of string

2 plastic cups* with a hole drilled in the bottom of each

2 paper cups* with a hole drilled in the bottom of each

2 metal cups (empty 10 oz. cans)* with a hole drilled in the bottom of each, tape rim to avoid sharp edges

paper clips

*in all cups the variables of size and shape should be as identical as possible

Prior to assessment: Students need to know how to construct a table and record observations.

Time needed: 1-2 45-minute class periods

Procedure:

Students construct three different string telephones. They send messages and listen in each of the different telephones. They record observations in a data table and rank each telephone as to quality of sound.

Kind of Telephone	Observations	Ranking
Plastic cups		
Paper cups		
Metal		

Scoring Rubric:

1 point: Student makes some attempt to conduct experiment with little or no observations or rankings

2 points: Student conducts experiment but does not record accurate observations or rankings

3 points: Student conducts experiment and makes mostly accurate observations and rankings

4 points: Student conducts thorough experiment, records accurate observations and rankings